

Peromyscus attwateri. By David James Schmidly

Published 28 June 1974 by The American Society of Mammalogists

Peromyscus attwateri J. A. Allen, 1895
Texas Mouse

Peromyscus attwateri J. A. Allen, 1895:330. Type locality
Turtle Creek, Kerr Co., Texas.

CONTEXT AND CONTENT. Order Rodentia, Family Muridae, Subfamily Cricetinae, Subgenus *Peromyscus*. *Peromyscus attwateri* is monotypic (Schmidly, 1973).

DIAGNOSIS. The size is medium for the genus; tail about as long as head and body, bicolored, moderately well haired, and generally well tufted at the end; hind feet large (24 to 27 mm); ankles usually dark or dusky; ears medium, smaller than in *P. truei*; skull (figure 1) large (27.6 to 30.4 mm); braincase elongated and wide, but not rounded; maxillary region of zygoma heavy; zygomatic arches parallel and not converging anteriorly; nasals short in relation to length of rostrum; pterygoid fossa large; auditory bullae medium, larger than in *P. maniculatus* and *P. leucopus* but smaller than in *P. truei*; interorbital constriction smooth and not angular; infraorbital canal wide; rostrum depressed anteriorly; phallus long, two-thirds the length of the hind foot; baculum long, half the length of the foot; terminal cartilaginous cone on the baculum minute; dental pattern complex (true mesolophid always present); the distinctive karyotype is described under GENETICS.

GENERAL CHARACTERS. Total length is 182 to 220 mm; interorbital constriction 4.0 to 4.8; zygomatic breadth 13.6 to 15.4; length of palatine foramen 5.5 to 6.4; depth of skull 9.2 to 10.3. Dorsal coloration near Sayal Brown (color terms after Ridgway), darker and mixed with blackish along the median dorsal area; sides Pinkish Cinnamon; underparts pure white, the base of the fur plumbeous.

Brown (1963) documented developmental and seasonal molts in *P. attwateri* from southwestern Missouri. There are five distinct pelages in the life cycle of *P. attwateri*: juvenile pelage (duration 5 weeks), subadult pelage (7 weeks), young adult pelage (3 weeks), intermediate pelage (7 weeks), and full adult pelage. Two annual molts occur in natural populations of *attwateri*; one in spring and a second in autumn. The summer and winter pelages differ in color; the winter pelage is a drab brown and the summer pelage a bright cinnamon brown.

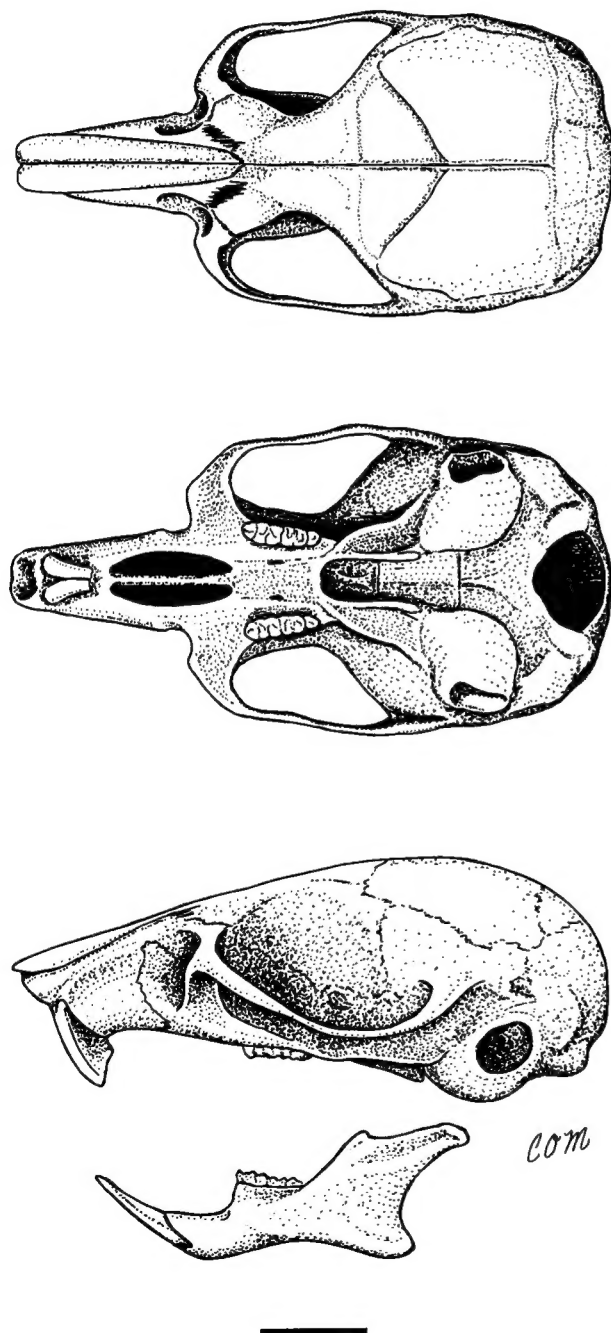


FIGURE 1. Dorsal, ventral, and lateral views of skull of *Peromyscus attwateri*, TCWC 271, male from Ingram, Kerr Co., Texas. Drawn by Chester O. Martin. Scale at bottom represents 5 mm.

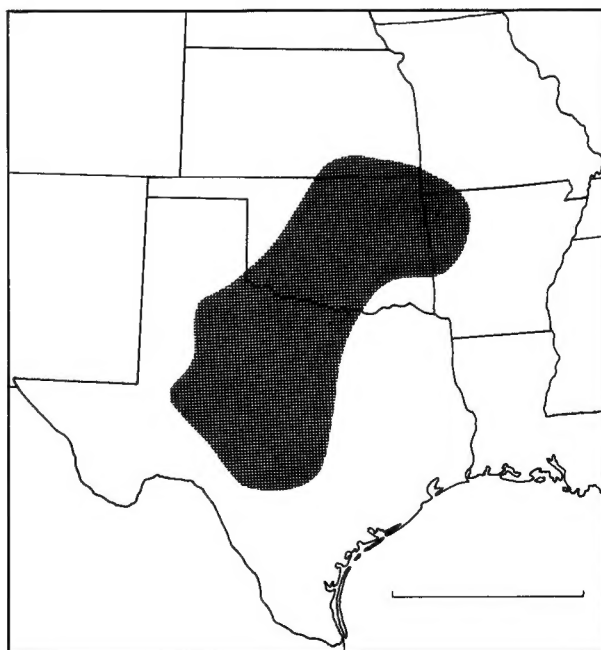


FIGURE 2. Geographic distribution of *Peromyscus attwateri* in the south-central states of the United States. Scale at bottom represents 500 km.

DISTRIBUTION. The distribution of this species is mapped in Figure 2. *P. attwateri* has a partially dendritic and somewhat discontinuous distribution in Missouri, Kansas, Arkansas, Oklahoma, and Texas because of the close restriction of these mice to rocky situations (Schmidly, 1973). In Missouri, *attwateri* is confined to the juniper-grass glades of the Ozark Mountains along the White and Elk river drainages in the southwestern part of the state (Brown, 1964a). In Kansas, *attwateri* is known from the southeastern part of the state in Cherokee County and from the cliffs along tributaries of the Caney River in Chautauqua and Cowley counties (Choate, *et al.*, 1966). In Oklahoma, *attwateri* is known from the Ouachita, Ozark Cherokee Prairie, and Osage Savanna biotic districts in the eastern part of the state and from the Wichita Mountain biotic district in south-central Oklahoma (Blair, 1939). *P. attwateri* in Arkansas is known from the Ozark and Ouachita mountains in the northwestern part of the state. In Texas, *attwateri* is known from the Edwards Plateau, the Balcones Escarpment, and the Central Mineral Region of south-central Texas, from the escarpment of the Llano Estacado in western Texas, and from the gypsum plains and red-beds of north-central Texas.

FORM AND FUNCTION. Schmidly (1973) described the molar teeth of *P. attwateri* and discussed geographic variation in dental features. Brown (1964a) studied water requirements of *attwateri* in the laboratory and found they consume on the average about 3500 mm³ of distilled water per day.

ECOLOGY. In Missouri, *P. attwateri* occurs on the steep faces of bluffs along the stream courses where the mice make their homes in crevices in the abundant outcrops of dolomite rock (Brown, 1964a). The vegetation of the glades is predominantly grass with a scattering of eastern red cedar (*Juniperus virginiana*) and scrubby woodlands. In Kansas, these mice are usually found on high cliffs that support stands of blackjack oak (*Quercus marilandica*). In northeastern Oklahoma (Blair, 1938) they are abundant in the ravine-forest association along narrow steep-walled ravines cut into the limestone strata where the principal vegetation includes oak, black hickory, and elm. Garner (1967) reported the Texas mouse to be common along the eastern edge of the Llano Estacado escarpment in rocky cliff habitats under juniper cover.

In southwestern Missouri, *P. attwateri* occurs together with *P. leucopus noveboracensis* and *P. maniculatus ozarkiarum* (Brown, 1964a). *P. maniculatus* is restricted primarily to grassland and old-field succession areas, *leucopus* to the hardwood forest, and *attwateri* to the cedar glades. The three species potentially occur together on the same site only in the cedar glade habitat; however, interspecific behavioral differences segregate them into different niches.

Little is known of reproduction in *P. attwateri*. For *attwateri* from southwestern Missouri, Brown (1964a) noted one period of breeding in the autumn and another in the spring. Brown (1964b) also noted that the corpora lutea of pregnancy persisted morphologically for about 2 months after the end of each reproductive season. Garner (1967) interpreted the presence of subadults in western Texas from January to June as indicative of breeding activity throughout winter. He found no evidence of breeding during late spring and summer. Long (1961) recorded a pregnant female in December from southeastern Kansas and interpreted this as evidence of winter breeding. Cockrum (1952) reported that lactating females have been taken in April and October from northwestern Arkansas.

Litter size in *P. attwateri* shows seasonal variation. Long (1961) reported a pregnant female (in December from Kansas) with three embryos, whereas three females collected in April had three, four, and five embryos. Three females from Missouri contained four, four, and six embryos (Cockrum, 1952:81).

Little is known concerning age at sexual maturity in *P. attwateri*. Brown (1963) noted that in *P. attwateri* from Missouri most animals in breeding condition are in young adult pelage. No sexual activity occurs in mice totally in the gray juvenile pelage. The estimated mean life-span of 39 mice is 6.8 months and the estimated maximum life-span is 18 months (Brown, 1964c).

Garner (1967) reported the highest density of *P. attwateri* from western Texas as 1.4 and 1.2 residents per acre in April and February. He calculated that the average linear distance moved by males is 47.5 m (156 feet) and by females, 27.4 m (90 feet). The population density of *attwateri* in Missouri varied from a high of 5.35 per h (2.17 per acre) in December 1961 to a low of 0.69 per h (0.28 per acre) in August 1962 (Brown, 1964c). The average home range of *P. attwateri* is

0.2 h (0.49 acres) and the home ranges of males average almost twice as large as those of females (Brown, 1964c). Home ranges are distinctly horizontal, indicating mice have a tendency to move along parallel outcrops of dolomite that cross glades instead of crossing grassy barren areas between successive ledges. The protection afforded and the natural avenue for movement provided by exposed ledges of rock are the obvious factors in the linear shapes of home ranges of these mice.

Brown (1964a) reported the stomach contents of *P. attwateri* taken in Missouri from March to December to contain the following food items (by volume): seed fragments, 60.3%; insect fragments, 31; berry integuments, 4.4; green plant fragments, 1.6; bulb fragments, 2.6. Black (1937) and Cockrum (1952) reported acorn pulp, seeds, and insects in stomach contents of *P. attwateri* from Kansas. Long (1961), who analyzed 38 stomachs of this species from Kansas, found acorns to be the most commonly used food in winter and spring; seed coats were found only rarely and insects were absent.

Long (1961) discussed several behavioral adaptations in *attwateri* that seem in harmony with its scansorial mode of existence. According to Long (1961), the Texas mouse, in comparison to other species of *Peromyscus*, is a superior and more cautious climber, seldom jumps from high places when under stress, and is capable of finding its way better in partial darkness. Morphological adaptations that probably correlate with the aforementioned behavioral adaptations include the long, tufted tail, which is used in balancing and as a prop when the mouse is climbing a vertical surface, and large, protuberant eyes, which may aid the mouse in performing activities in the partial darkness of a deep crevice or hole in a cliff. Long (1961) found no evidence of tree-climbing in *P. attwateri*.

Brown (1964a) studied intraspecific and interspecific behavior in *P. attwateri* and two other species, *P. leucopus* and *P. maniculatus*. Aggressiveness between males does not occur in *attwateri*. All individuals regardless of sex, exhibit compatibility and frequently all animals nest together in the same nest box. In comparing the behavior of the three species, Brown (1964a) noted that *attwateri* is in general much more docile and deliberate in its movements than is either *P. maniculatus* or *P. leucopus*.

Little is known about predation upon *P. attwateri*. Brown (1964c) observed a broad-winged hawk (*Buteo platypterus*) with an adult *attwateri* in its talons and found the remains of one individual in the stomach of an eastern coachwhip snake (*Masticophis flagellum flagellum*).

GENETICS. *Peromyscus attwateri* has a karyotype consisting of three pairs of large biarmed, two pairs of small biarmed, and 18 pairs of large to small acrocentric autosomes (Lee *et al.*, 1972). The number of autosomal arms is 56. The X chromosome is a large submetacentric and the Y is a small submetacentric.

REMARKS. *Peromyscus attwateri* was considered a subspecies of *P. boylii* by Bailey (1906:57). However, new cytological (see Lee *et al.*, 1972) and morphological (see Schmidly, 1973) evidence reveals *attwateri* to be specifically distinct from *boylii*.

LITERATURE CITED

- Allen, J. A. 1895. Descriptions of new American mammals. Bull. Amer. Mus. Nat. Hist. 7:327-340.
- Bailey, V. 1906. A new white-footed mouse from Texas. Proc. Biol. Soc. Washington 19:57-58.
- Black, J. D. 1937. Mammals of Kansas. Kansas State Board Agric., 30th Biennial Report, 35:116-217.
- Blair, W. F. 1938. Ecological relationships of the mammals of the Bird Creek Region, northeastern Oklahoma. Amer. Midland Nat. 20:473-526.
- 1939. Faunal relationships and geographic distribution of mammals in Oklahoma. Amer. Midland Nat. 22:85-133.
- Brown, L. N. 1963. Maturational molts and seasonal molts in *Peromyscus boylei*. Amer. Midland Nat. 70:466-469.
- 1964a. Ecology of three species of *Peromyscus* from southern Missouri. Jour. Mammal. 45:189-202.
- 1964b. Persistence of corpora lutea at the end of the breeding season in *Peromyscus*. Jour. Mammal. 45:260-264.
- 1964c. Dynamics in an ecologically isolated population of the brush mouse. Jour. Mammal. 45:436-442.
- Choate, J. R., C. J. Phillips, and H. H. Genoways. 1966. Taxonomic status of the brush mouse, *Peromyscus boylii cansensis* Long, 1961. Trans. Kansas Acad. Sci. 69:306-313.

- Cockrum, E. L. 1952. Mammals of Kansas. Univ. Kansas Publ., Mus. Nat. Hist. 7:1-303.
- Garner, H. W. 1967. An ecological study of the brush mouse, *Peromyscus boylii*, in western Texas. Texas Jour. Sci. 19:285-291.
- Lee, M. R., D. J. Schmidly, and C. C. Huheey. 1972. Chromosomal variation in certain populations of *Peromyscus boylii* and its systematic implications. Jour. Mammal. 53:697-707.
- Long, C. A. 1961. Natural history of the brush mouse (*Pero-*

- myscus boylii*) in Kansas with description of a new subspecies. Univ. Kansas Publ., Mus. Nat. Hist. 14:99-110.
- Schmidly, D. J. 1973. Geographic variation and taxonomy of *Peromyscus boylii* from Mexico and the southern United States. Jour. Mammal. 54:111-130.

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